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In the Supreme Court of the United States.

October Term, 1991

COMMONWEALTH OF MASSACHUSETTS, et al.,
Cross-Appellants,

v.

BARBARA FRANKLIN,
SECRETARY OF COMMERCE, et al.,
Cross-Appellees.

ON CROSS-APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF MASSACHUSETTS

CROSS-APPELLANTS' JURISDICTIONAL STATEMENT

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QUESTION PRESENTED

A unanimous, three-judge district court held that the defendant Secretary of Commerce acted arbitrarily and capriciously, in violation of the Administrative Procedure Act (APA), 5 U.S.C. § 706(2)(A), by deciding to reverse historic census policy and include federal government employees posted overseas and their dependents in the apportionment counts of states where they were not residing. In addition, the district court considered the cross-appellants' constitutional claim under Article I, Section 2 of the United States Constitution, which provides that Representatives in the United States House of Representatives shall be chosen "by the People of the several states" (Cl. 1) and that these Representatives

"shall be apportioned among the several States which may be included within this Union, according to their respective Numbers" (Cl. 3; 14th Amend., § 2). While accepting the premise that apportionment of congressional seats among the states ("interstate apportionment") is subject to the "one person, one vote" principle of the Constitution, the district court, nevertheless, held that the challenged statute, 2 U.S.C. § 2a, passed constitutional muster. In its Final Decrees and Orders, the district court issued an Order (since stayed by this Court pending appeal) to the Executive Branch defendants and the Clerk of the House to issue proper statements and certificates of entitlement to the two states affected by this practice,

Washington and Massachusetts.[1/]

The questions presented in this cross-appeal are:

1. Whether 2 U.S.C. § 2a, which provides for apportionment of Representatives on the basis of a mathematical formula known as the "method of equal proportions," violates the one person, one vote requirement under the U.S. Constitution and, thus,

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1/ The lower court's orders stated in relevant part:

"3. That the Executive Branch Defendants shall submit to [the Clerk] a statement showing the number of Representatives to which each state would be entitled as a result of the 1990 decennial census under 2 U.S.C. § 2(a)(a), without inclusion of overseas census counts in the apportionment count;

"4. That ... the Clerk ... shall on or before April 10, 1992, send the executive of each state a recertification for the number of Representatives to which such state is entitled in accordance with paragraph 3 of this Order ..."

fails to satisfy the constitutional requirement that Representatives be "apportioned among the several States . . . according to their respective Numbers."

2. Whether this Court should, as a prudential matter, order the district court's orders to be modified so as to prohibit the 1990 apportionment from taking effect only as to the states of Washington and Massachusetts, in which event, pursuant to 2 U.S.C. § 2a(b), those states will retain the same number of Representatives as they were awarded in the 1980 reapportionment, pending any subsequent statute.

PARTIES TO THE PROCEEDINGS

The cross-appellants herein, who were the plaintiffs below, are the Commonwealth of Massachusetts and two of its registered voters, Edward F. Berlin and Karen J. Kepler.

The cross-appellees in this Court, who were defendants in the district court, are Barbara Franklin, Secretary of Commerce (substituted as a party pursuant to Rule 35.3 of this Court); Michael F. Plant, Acting Under Secretary of Commerce for Economic Affairs (also substituted pursuant to Rule 35.3); the Bureau of the Census; Barbara Bryant, Director of the Bureau of the Census; George Herbert Walker Bush, the President of the United States; and Donnald K. Anderson, Clerk of the United States House of Representatives.

TABLE OF CONTENTS

	Page
QUESTION PRESENTED	i
PARTIES TO THE PROCEEDINGS	v
TABLE OF AUTHORITIES	viii
OPINIONS BELOW	1
JURISDICTION	2
CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED	2
STATEMENT	3
A. Historical Background.	5
B. The Proceedings in this Case.	12
THE QUESTIONS ARE SUBSTANTIAL	16
CONCLUSION	47
APPENDIX	1a

TABLE OF AUTHORITIES

Cases

Federal Energy Administration v. Algonquin SNG, Inc., 426 U.S. 528 (1976) 47

Franklin v. Massachusetts, U.S. No. 91-1502 5, 19, 43

Karcher v. Daggett, 462 U.S. 725 (1983) 15, 16, 20, 23, 27, 28, 32, 36, 40, 41

Katzenbach v. Morgan, 384 U.S. 641 (1966) 14, 25

Kirkpatrick v. Preisler, 394 U.S. 526 (1969) 21, 36, 41

Leary v. United States, 395 U.S. 6 (1969) 34

McCulloch v. Maryland, 4 Wheat. 316 (1819) 24

Mills v. Electric Auto-Lite Co., 396 U.S. 375 (1970) 47

Montana v. United States Dep't of Commerce, 775 F.Supp. 1358 (D. Mont. 1991), prob. juris. noted, 112 S.Ct. 656 (1991) 3, 5, 17, 18, 19, 30

Reynolds v. Sims, 377 U.S. 533 (1964) 41

Wells v. Rockefeller,
394 U.S. 542 (1969) 36

Wesberry v. Sanders,
376 U.S. 1 (1964) passim

White v. Weiser,
412 U.S. 783 (1973) 36, 40

Yick Wo v. Hopkins,
118 U.S. 356 (1886) 14

Constitution and Statutes

U.S. Const.:
Art. I: 28
§2 i, 5, 13, 21, 22
Cl.1 i, 2, 41
Cl. 3 ii, 2, 23
§8 2
Cl. 18
Amend. XIV:
§2 ii, iii, 2
§5 2, 24

Act of Nov. 15, 1941, §2(a),
55 Stat. 762 6

2 U.S.C. § 2a ii, 3, 6, 12, 47

2 U.S.C. § 2a(a) iii, 3, 12, 13, 43, 44

2 U.S.C. § 2a(b) iv, 46

5 U.S.C. § 706(2)(A) i

28 U.S.C. § 1253 2, 3

28 U.S.C. § 2284(a) 3

Rules

U.S. Sup. Ct. Rule 35.3 v

Miscellaneous

Report of the National Academy of Sciences Committee on Apportionment from the Annual Report of the National Academy of Sciences, Fiscal Year 1928-29 8

M.L. Balinski and H.P. Young, Fair Representation: Meeting the Ideal of One Man, One Vote (New Haven: Yale University Press, 1982) 19

The Writings and Speeches of Daniel Webster, National Edition (Boston: Little, Brown, 1903, Vol. 6) 9, 24

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OPINIONS BELOW

The opinion of the three-judge district court and its order denying reconsideration and a stay are not yet reported. They are reproduced in the Appendix to Appellants' Jurisdictional

Statement herein ("Appt. J.S. App.") at 1a-84a and 85a-93a, respectively.

JURISDICTION

The judgment of the three-judge district court was entered on February 20, 1992, and the notice of appeal filed on March 16, 1992. The Court noted probable jurisdiction on March 20, 1992. The notice of cross-appeal was then filed on March 23, 1992. (Appendix hereto ("App.") at 57a-58a.) The jurisdiction of this Court is invoked under 28 U.S.C. § 1253.

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

Article I, Section 2, Clauses 1 and 3, and Section 8, Clause 18 of the United States Constitution; Sections 2 and 5 of the Fourteenth Amendment to the

U.S. Constitution; 28 U.S.C. §§ 1253 and 2284(a); and 2 U.S.C. § 2a. Appt. J.S. App. 99a-103a.

STATEMENT

Cross-appellants challenge that portion of the district court's decision which upheld the constitutionality of the Act of Congress which prescribes the "method of equal proportions" (also known as the "Hill method") as the mathematical formula for apportioning Representatives among the States. 2 U.S.C. § 2a(a); Appt. J.S. App. 27a-56a. This holding is in conflict with that in Montana v. United States Dep't of Commerce, 775 F.Supp. 1358 (D. Mont. 1991), prob. juris. noted, 112 S.Ct. 656 (1991) ("Montana") that the Hill method does not comport "as nearly as practicable" with the constitutional

requirement of "one person, one vote" which the Massachusetts district court conceded to be applicable to the interstate apportionment of congressional districts, just as it is to the intrastate apportionment of such districts. The court below erred in failing to apply the "as nearly as practicable" standard in the context of interstate apportionment, instead according Congress undue discretion to choose a method which falls demonstrably short of achieving "one person, one vote" -- i.e., ensuring that "as nearly as practicable one man's vote in a congressional election is to be worth as much as another's." Wesberry v. Sanders, 376 U.S. 1, 7-8 (1964). The mathematical apportionment formula known as the Webster method, not the Hill method, achieves the constitutional

ideal of one person, one vote "as nearly as practicable."

A. Historical Background.

The constitutional history of Article I, Section 2 of the U.S. Constitution, a product of the Great Compromise at the 1787 Constitutional Convention, has been set forth at great length in the parties' briefs to this Court in the Montana proceedings. Similarly, the history of congressional apportionment formulas has been set forth in those procedings, in the Stipulation of Facts in the court below (contained in the Joint Appendix for Franklin v. Massachusetts, U.S. No. 91-1502, at Tab 5 (hereinafter "Stip. ___")) and in the district court's opinion (Appt. J.S. App. 30a-40a). That history will not be repeated except to

focus on the background of the two apportionment formulas principally at issue here, the Hill and Webster methods.

1. In 1941, Congress determined that the Hill method was the most appropriate method of apportionment and passed a statute which provided that Representatives were to be automatically apportioned under this method, in the manner now prescribed by 2 U.S.C. § 2a. Act of Nov. 15, 1941, §2(a), 55 Stat. 762; see Stip. 67. In January of that year, the President had transmitted to Congress apportionments based upon both the Hill method and the Webster method. The methods produced the same apportionment except for two states, Arkansas and Michigan. The Hill method resulted in an additional seat for Arkansas, a largely Democratic state; the Webster method resulted in an

additional seat for Michigan, a largely Republican state. Stip. 67. Congress debated the apportionment methodologies and enacted legislation adopting the Hill method, by a vote in which every Democrat (except those from Michigan) voted for, and every Republican voted against, the bill. Stip. 67. Thus, adoption of the Hill method was essentially the product of political expediency. No legislation affecting the method of apportionment has been passed by Congress since 1941. As a result, the Hill method has been used for each subsequent apportionment, including 1990.

2. When Congress adopted the Hill method, it had the results of a National Academy of Sciences (NAS) study which had been completed in 1929. Stip. 69. The report analyzed five methods:

smallest divisors (Adams method), harmonic means (Dean method), equal proportions (Hill method), major fractions (Webster method), and greatest divisors (Jefferson method). Stip. 68. It listed them in the order in which they "favor the larger States as compared with the methods which precede it" (the Adams method favoring the small states the most, Jefferson favoring the large states the most, and the Hill method listed third among the five). The study recommended adoption of the Hill method, concluding that it "occupies mathematically a neutral position with respect to emphasis on larger and smaller states" -- a conclusion based on the happenstance that the Hill method ranked third among the five methods studied. (Report of the National Academy of Sciences

Committee on Apportionment from the Annual Report of the National Academy of Sciences, Fiscal Year 1928-29, pp. 20-23). Stip. 69.

3. Unlike the Hill method, the Webster method was used as far back as 1840. The Webster method represents the solution proposed by its namesake to the apportionment problem:

> Let the rule be that the population of each state be divided by a common divisor, and, in addition to the number of members resulting from such division, a number shall be allowed to each State whose fraction exceeds a moiety of the divisor.

The Writings and Speeches of Daniel Webster, National Edition (Boston: Little Brown, 1903, Vol. 6), at 120.

Following the 1840 census, the Congress legislated use of the Webster method for the apportionment

calculation. Stip. 62. As then employed, with no mandate that the size of the House be fixed, it used a fixed ratio (of a pre-specified number of persons per representative), but an additional seat was assigned for each fractional remainder greater than one-half. For example, if the ratio (otherwise known as the "House seat quota" -- see n.5 infra) for a state was 3.2, the state received three representatives. But if the ratio was 3.9 (or anything greater than 3.5, but less than 4.5), the state received four representatives. This method also did not require that the size of the House be a fixed number (and in fact would need to be modified for use with a fixed House size); the total number of representatives again was the sum of the

representatives allocated to each state under this method.

For the apportionment following the censuses of 1850 through 1900, Congress legislated use of the Vinton method. Stip. 63. In recognition of the deficiencies of the Vinton method, Congress in 1910 again legislated use of the Webster method. Stip. 63-64.

4. Congress could not decide on an apportionment plan following the 1920 census, but in 1929 passed a law that made reapportionment automatic, using whatever method was used for the previous apportionment in the event the Congress did not agree on another method. Stip. 65. Thus, the Webster method was also used to apportion congressional seats in 1930. As noted, the Hill method was adopted for the

following apportionment (1941) and has been used since. Stip. 67.

B. The Proceedings in this Case.

Following the 1990 census, the President, on January 3, 1991, transmitted to Congress the statement required by 2 U.S.C. § 2a(a). Under the method of equal proportions, Massachusetts was entitled to ten Representatives, a loss of one.

On May 1, 1991, cross-appellants (the Commonwealth of Massachusetts and two of its registered voters) commenced this suit against the Secretary of Commerce, the Census Bureau, and other federal officials, challenging the constitutionality of 2 U.S.C. § 2a. Cross-appellants alleged that use of the Hill method to apportion Representatives

among the states contravenes Article I, Section 2 of the Constitution, and urged adoption of the Webster method.

On February 20, 1992, the district court, rejecting the holding in Montana, held that the method of apportioning seats in the House of Representatives under 2 U.S.C. § 2a(a) does not violate the United States Constitution. Appt. J.S. App. 50a-56a, 94a. The court accepted cross-appellants' contention that the one person, one vote principle applies in the context of the interstate apportionment of congressional districts. Appt. J.S. App. 50a. The court also noted the "mathematically demanding" Supreme Court standard of review of state congressional intrastate districting. Appt. J.S. App. 42a-43a.

But the district court applied a different standard of review to the

interstate apportionment of congressional districts. Rather than requiring Congress to meet the same burden a state legislature must meet when apportioning congressional districts, the district court deferred to the discretion of Congress to choose any apportionment formula "plainly adapted to the end of approximating as close as practicable the goal of 'one person, one vote.'" Appt. J.S. App. 48a, 51a. The court reached this result by relying on Congress's powers under Section 5 of the Fourteenth Amendment, citing Katzenbach v. Morgan, 384 U.S. 641, 651 (1966). In so doing, the court failed to recognize the fundamental right to vote guaranteed to individuals by the Constitution, Wesberry, 376 U.S. at 17 and Yick Wo v. Hopkins, 118 U.S. 356, 370 (1886), and the corresponding

"unusual rigor" applied to legislative action affecting that right. See Karcher v. Daggett, 462 U.S. 725, 730, 732 (1983).

As noted, the court below also held that the Secretary of Commerce acted arbitrarily and capriciously, in violation of the APA, by reversing prior policy and deciding to include overseas federal employees in state apportionment counts. Appt. J.S. App. 82a. The court entered Final Orders and Decrees, since stayed by this Court pending appeal, which require that the Executive Branch defendants certify to the House Clerk the number of seats which each state would receive based on apportionment counts that do not include overseas employees, and that the Clerk send revised certificates of entitlement to

the affected states, Washington and Massachusetts. Appt. J.S. App. 95a.

THE QUESTIONS ARE SUBSTANTIAL

The district court has held consitutional a method of apportionment which does not achieve the one person, one vote ideal as nearly as practicable, even as it acknowledged that the one person, one vote ideal applies in the context of interstate apportionment, as it does in intrastate apportionment. In so doing, the court ruled that Congress has discretion to choose any means reasonably adapted to the achievement of that ideal. It disregarded the "unusual rigor" applied to the "as nearly as practicable" requirements of Wesberry and Karcher. This conclusion was reached without a single reference to

the fact that the right to vote is fundamental under the Constitution, and that the "as nearly as practicable" standard finds its roots in this Court's decisions recognizing the fundamental importance of that individual right. The district court thus applied the wrong standard for judicial review where Congress's action denies citizens the right to an equal vote "as nearly as practicable" in the context of interstate apportionment.

The constitutional issues presented are of paramount importance. In the above respects, the judgment below squarely contradicts the holding in Montana. In addition, depending upon the outcome of the appeal by the federal defendants of the district court's holding on the issue of federal overseas

employees, the judgment below may affect the number of Representatives to which Massachusetts will be entitled in Congress and the number of Presidential electors to which the state will be entitled in the 1992 election.

In addition, the Commonwealth presents, as compared with the State of Montana in Montana, a better-established and superior method of apportionment -- the "Webster" or "major fractions" method. This is a method endorsed as achieving, as nearly as practicable, the principle of one person, one vote, by one of the nation's preeminent experts on congressional apportionment, whose affidavits are a matter of record in the proceedings below, and who submitted an affidavit lodged with this Court in Montana. App. 1a-56a (hereinafter

"Young Aff."). [2/]

Accordingly, this case, like Montana and the federal government's Franklin appeal, warrants review this Term on the same schedule as this Court will consider that appeal, so that these and other States may proceed to implement a final apportionment of their congressional districts. Accordingly, cross-appellants respectfully submit that probable jurisdiction should be

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2/ Professor Young co-authored the leading text on apportionment history and formulas, which has been cited repeatedly in the parties' briefs below and in Montana, and by both district courts which have confronted the issue: M.L. Balinski and H.P. Young, Fair Representation: Meeting the Ideal of One Man, One Vote (New Haven: Yale University Press, 1982).

The affidavits of Professor Young and the federal defendants' expert, Dr. Lawrence Ernst, were lodged with this Court by those defendants in the Montana proceedings.

noted and the case should be set for briefing and argument in accordance with the schedule promulgated by this Court's order dated March 20, 1992.

A. The district court applied the wrong standard for judicial review of congressional action affecting a fundamental right such as the right to an equal vote.

1. In the intrastate context, the Supreme Court has consistently applied the principle that Article I, Section 2 requires equal representation "as nearly as is practicable." Wesberry, 376 U.S. at 7-8; Karcher, 462 U.S. at 730. Unlike the approach taken by the district court, this Court has emphasized the "unusual rigor" inherent in the "'high standard of justice and common sense' for the apportionment of congressional districts." Karcher, 462

U.S. at 730 (quoting Wesberry, 376 U.S. at 18). This Court has thus tolerated very little deviation in the application of the "as nearly as practicable" standard, allowing for "'only the limited population variances which are unavoidable despite a good-faith effort to achieve absolute equality, or for which justification is shown.'" Karcher, 462 U.S. at 730 (quoting Kirkpatrick v. Preisler, 394 U.S. 526, 531 (1969)). As this Court has clearly stated, the rule in apportionment formulas should be "one of 'practicability' rather than political 'practicality." Kirkpatrick, 394 U.S. at 533.

2. The text of Article I, Section 2 and the historical background to the Great Compromise indicate that the "as nearly as practicable" standard

should be applied in the interstate apportionment of House seats. Article I, Section 2 explicitly states that its terms apply to apportionment "among the several States." (Emphasis added.) It was the Great Compromise itself, predominantly concerned with the allocation of representation among the States, that gave rise to Article I, Section 2 and its underlying principle that apportionment of House seats shall be based on population. Wesberry, 376 U.S. at 13. The district court itself observed that this allocation "was at the heart of the bargain by which the several states agreed to enter into and remain a union" and "the issue central to successful drafting of the Constitution in 1787." Appt. J.S. App. 27a-28a.

3. Because of the mandates that every state must receive at least one seat and no district may cross a state boundary, absolute equality of representation is impossible. Art. I, §2, cl. 3. These constitutional mandates, however, in no way suggest, much less require, that the goal of equal representation "as nearly as practicable" be abandoned, or even applied with any less "rigor," in the context of apportionment of congressional districts among the states. To the contrary, the "as nearly as practicable" standard has that much more meaning in this context. It evolved in this Court precisely because absolute equality in legislative apportionment is virtually impossible. Karcher, 462 U.S. at 730.

Indeed, this standard finds its roots in the early history of interstate apportionment. Daniel Webster observed in 1832 that the Constitution requires "Congress to make the apportionment of Representatives among the several States according to their respective numbers, as near as may be. That which cannot be done perfectly must be done in a manner as near perfection as can be." D. Webster, The Writings and Speeches of Daniel Webster at 107-09 (1903) (emphasis in the original).

4. The district court was plainly wrong in its attempt to justify holding Congress to a lower standard in interstate districting than are states in intrastate districting. According to the court, Section 5 of the Fourteenth Amendment and McCulloch v. Maryland, 4 Wheat. 316 (1819) support the

proposition that Congress needs merely to choose an apportionment formula "plainly adapted to the end" of "approximating" the one person, one vote standard. Appt. J.S. App. 51a. The district court rests this conclusion upon Congress's power under Section 5 of the Fourteenth Amendment, citing Katzenbach v. Morgan, 384 U.S. 641, 650 (1966). Appt. J.S. App. 48a-49a, 50a-51a.

Nowhere does the district court confront the fact that an individual's right to vote is fundamental. As this Court itself has commented,

> No right is more precious in a free country than that of having a voice in the election of those who make the laws under which, as good citizens, we must live. Other rights, even the most basic, are illusory if the right to vote is undermined.

Wesberry, 376 U.S. at 17. The district court's holding misses the fundamental constitutional point to which the "as nearly as practicable" requirement is addressed: the right of each citizen to equal representation, i.e., to have one's vote count as much as another's. Wesberry, 376 U.S. at 8. From the Constitutional Convention to Wesberry to Karcher to the present, it is the representation of the "people as individuals, and on a basis of complete equality for each voter" that the Constitution protects. Wesberry, 376 U.S at 14. Where legislation abridges the fundamental right to have one person's vote count as much as another's, Congress should not be accorded the deference to choose any apportionment formula which may be "adapted to the end" of "approximating"

a legislative apportionment goal.[3/] Instead, this Court should review Congress's choice of apportionment formula to determine if it meets the rigorous standard of equal representation for each citizen as nearly as practicable.

B. The one person, one vote goal in interstate apportionments requires equalizing each voter's share of a representative as nearly as practicable.

1. In intrastate apportionments, the Wesberry ideal of providing

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3/ By leaving Congress discretion to choose any method "plainly adapted to the end of approximating as close as practicable the goal of "'one person, one vote'" Appt. J.S. App. 51a (emphasis added), the district court robs the "as nearly as practicable" standard of its plain meaning and of the rigorous scrutiny which it imports. See Karcher, 462 U.S. at 730, 732. This is demonstrated in practical terms at pt. C and D, infra.

equal representation "as nearly as is practicable" is met by equalizing district sizes. Karcher, 462 U.S. at 730. Even de minimis differences in the ideal number of persons per district are unconstitutional if they can practicably be avoided. Karcher, 462 U.S. 731-44.

In the interstate context, attempting to achieve equal district sizes does not best effectuate this paramount goal. Because of the constraints imposed by Article I, that no district may cross a state boundary and each state must receive at least one seat, substantial discrepancies in district size among the states are inevitable. It is thus impossible to have each House seat represent the same number of people. Young Aff., ¶19. (App. 14a-15a.) Minimizing discrepancies in district sizes through apportionment formulas

does not, in the interstate context, necessarily treat individuals equitably. It may tend to produce similar numbers for each representative; but the Constitution does not protect the right of each Congressman to have equal numbers of people in his or her district. Young Aff., ¶40 (App. 30a).

Instead, the goal in apportioning congressional districts is to make each person's vote "worth as much as another's." Wesberry, 376 U.S. at 8. By definition, this requires a per capita or per voter standard. This necessitates focus on each voter's "share of a representative." Young Aff., ¶¶19-23 (App. 14a-18a). In other words, only the "share-of-a-representative" principle truly expresses the "one person, one vote" standard enunciated in Wesberry and its

progeny. The Hill method is unconstitutional because it fails, when compared to Webster, to effectuate the "share-of-a-representative" principle, as explained below.

C. The Webster method is superior to all other methods in equalizing the value of each person's vote; it thus effectuates the constitutional ideal of one person, one vote.

1. Among so-called divisor methods of apportionment,[4/] only the Webster method effectuates the Wesberry per capita test. It does so by

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4/ Divisor methods of apportionment are the only ones at issue herein. See Brief of the Commonwealth of Massachusetts as Amicus Curiae in the Montana proceedings, at 29 n.11. The Hill, Adams, and Dean methods are also divisor methods. A divisor method operates by establishing a national average district size as the divisor, and then dividing this number into the state's population to obtain a quota.

minimizing the deviation between each voter's ideal share of a representative and his or her actual share as the result of the apportionment. Young Aff., ¶44 (App. 34a-35a). Moreover, in both absolute and percentage terms, it minimizes the inequality in representation between residents of each pair of states when matched against each other. Young Aff., ¶¶8, 14, 30, 38, 42, 44 (App. 6a-7a, 11a, 24a, 29a, 32a-33a, 34a-35a).

The Webster method also satisfies another key measure by which to equalize each voter's share of a representative: it brings every pair of states as near as possible to their quotas.[5/] This

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5/ A state's quota is the precise number of congressional seats to which a state would be entitled if fractional seats were included in the measure.

(footnote continued)

is true in both absolute and percentage terms. Young Aff., ¶¶30, 42 (App. 24a, 32a-33a-10a). In the process, the Webster method completely avoids "reversals," a phenomenon from which other methods, including Hill, suffer and which causes a formula to fail to meet the rigorous "as near as may be" standard. A reversal is where a state's quota of seats in the House is rounded up even though its fractional component is below .5 while, in the same apportionment, another state's quota is rounded down even though its fractional

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(footnote continued)

Thus, the quota is the aggregate measure of each individual's share of a representative. Young Aff., ¶5 (App. 4a-5a). Although it is impossible for states to receive their respective quotas because of the inherent problem associated with fractional remainders, the goal must be to stay as near the quota as possible, in accordance with the Karcher analysis.

component is above .5. Young Aff., ¶8 (App. 6a-7a).

The Webster method never leads to a reversal. Young Aff., ¶¶8, 31 (App. 6a-7a, 24a-25a). It produces apportionments that are always as near each state's quota as practicable. It is thus the only divisor method that produces results that meet the goal of Wesberry -- to equalize each voter's share of a representative -- free from the anomalies inherent in the other methods.

2. The Hill method fails to achieve the constitutional standard of one person, one vote. The Hill method was adopted prior to this Court's decision in Wesberry. "A statute which was once validly enacted or constitutional may be rendered unconstitutional by a change in the

facts or circumstances upon which it was based." Leary v. United States, 395 U.S. 6, 38 n.68 (1969).

a. Unlike the Webster method, the Hill method fails to minimize deviations in each voter's share of a representative. It relies on measuring relative differences in representation between states, a criterion which is neither standard nor appropriate to the goal of achieving minimal deviations from the standard of equality. Young Aff., ¶¶33, 37 (App. 26a, 28a). The effect of the Hill method is that citizens are not treated as equally as possible in terms of their shares of a representative. Young Aff., ¶41 (App. 31a-32a). For example, in the 1990 census, the Hill method, in giving Oklahoma 6 seats and Massachusetts 10, does not come as close as Webster would

(by giving Massachusetts 11 and Oklahoma 5) in giving each person equal representation as "near as may be" in both absolute and percentage terms. Young Aff., ¶¶41-42 (App. 31a-33a). A Webster apportionment brings both states closer, in both absolute and percentage terms, to the average share of a representative for the two states combined. Young Aff., ¶42 (App. 32a-33a).[6/]

6/ The district court's factual analysis of the validity of the Hill method of apportionment is plainly erroneous. The crux of the district court's analysis was to sanction the use of "relative departures from the ideal" which Hill measures. The district court then observed that the leading apportionment cases use "relative differences . . . as a critical element of evaluation." Appt. J.S. App. 53a. In these respects, the district court was simply mistaken. A review of those decisions reveals that they use percentage, not relative, differences

(footnote continued)

b. In contrast to the Webster method, the Hill method deviates from the quota, and produces reversals in such a way as to favor less populous states. Historically, the Hill method has already produced a number of reversals,[7] and would have produced

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(footnote continued)

as their measure. Karcher v. Daggett, 462 U.S. at 728; Kirkpatrick v. Preisler, 394 U.S. at 527; White v. Weiser, 412 U.S. at 785; Wells v. Rockefeller, 394 U.S. at 540-41. This is a crucial error. As Professor Young explains, use of percentage differences (the Webster method) is fully appropriate, and relative differences (the Hill method) completely inappropriate, in these types of measurements. Young Aff., ¶¶33-37 (App. 26a-28a).

7/ For example, in 1970 South Dakota, with a quota of 1.435 was rounded up, while Connecticut, with a quota of 6.503, was rounded down, under the Hill method. Young Aff., ¶31 (App. 24a-25a).

other, striking reversals in the years prior to its adoption.[8/] Moreover, these "reversals" always favor less populous states over more populous ones. Young Aff. ¶32 (App. 25a).

D. The Hill method is unconstitutional because it is systematically and inherently biased against more populous states.

1. Under the terms of the Great Compromise of 1787, less populous states were granted special representation in the Senate. To permit the use of any apportionment formula for House seats that was biased in favor of less populous states would directly

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8/ For example, in 1920, Rhode Island, New Mexico, and Vermont (with fractional remainders below .5) would have been rounded up, while Virginia, North Carolina and New York (with fractional remainders above .5) would have been rounded down. Young Aff. ¶¶28-29 (App. 22a-24a).

contravene the principles of the Great Compromise, and the requirement that the value of each person's vote be equalized. This is especially true where an unbiased method of apportionment is readily available.

The Hill method is unconstitional because it leads to apportionments that are systematically biased against more populous states, persistently giving the people of less populous states more representation per capita. Young Aff. ¶¶53-54, 58. (App. 44a-45a, 48a-49a). Since it was adopted in 1941, the Hill method has given small states, on average, over six percent more representation per capita than it has to more populous states. Young Aff. ¶58 (App. 48a-49a). This is not a statistical accident. If Hill's method had been used for every census from 1790

to 1990, it would have given, on average, over 3.3 percent more representation per capita to the small states than to the more populous states. Id.

2. In contrast, if the Webster method had been used in every apportionment since 1790, it would have given less populous states less than one-half of one percent more representation per capita than more populous states. Young Aff. ¶60 (App. 49a-50a). Moreover, over a longer series of apportionments, the Webster method can be expected to exhibit no discernible bias toward either more or less populous states. Young Aff. ¶62 (App. 51a-52a). Indeed, in every single census, the percentage difference between a person's share of a representative in more populous states

and a person's share of a representative in less populous states would have been smaller (or at least not larger) under Webster's method than under any other divisor method. In this respect, Webster apportionments come closest to implementing the Great Compromise and the ideal of one person, one vote. Young Aff. ¶61 (App. 50a).

The bias that the Hill method produces is not only persistent, but also constitutionally significant. This Court has routinely invalidated apportionment schemes that produce deviations from the ideal of even less than one percent. See, e.g., Karcher, 462 U.S. 725 (deviation of 0.6984 percent between largest and smallest district held unconstitutional); White, 412 U.S. 783 (deviation of .745 percent

invalidated); Kirkpatrick, 394 U.S. 526. Furthermore, factors that may justify even small deviations from the "as nearly as practicable" standard in state legislative redistricting cases do not apply in the interstate context. See Reynolds v. Sims, 377 U.S. 533, 578-81.

E. "As between two standards -- equality or something less than equality -- only the former reflects the aspirations of Art. I, §2." Karcher, 462 U.S. at 732. The Webster method best equalizes votes on a per capita basis, thereby achieving the Wesberry standard of "as near as practicable," and avoiding the fatal defects of the Hill method which render it unconstitutional. The judgment of the district court to the contrary warrants review.

F. As noted, the lower court also held that the Secretary acted arbitrarily and capriciously, in violation of the APA, by deciding to reverse historic census policy and include overseas federal employees and their dependents in state apportionment counts. Appt. J.S. App. 82a. On appeal, the Secretary contends that even if she acted arbitrarily, the lower court lacked the power to enter an order compelling the Executive Branch Defendants and the Clerk of the House to issue revised certificates of entitlement to Washington and Massachusetts. Appt. J.S. at 15, 28-29.

In fact, the three-judge court's orders simply implemented a Stipulation of the Parties, by which they agreed that the effect of the Secretary's

action was to deprive Massachusetts of one seat in the House and to transfer that seat to Washington state, Stip. 42., and a stipulation by the Clerk of the House in which he elected nominal party status and agreed to be bound by whatever orders might be entered against the Secretary.

In her Jurisdictional Statement, the Secretary argues that the lower court's orders constitute an impermissible intrusion into the authority of the President and Congress. This appears to be based solely on the statement in 2 U.S.C. § 2a(a) that "the President shall transmit to Congress" the figures provided by the Secretary of Commerce. In fact, as Massachusetts will argue more fully in the Franklin appeal, the transmittal of census results through

the office of the President is entirely ministerial. The President plays no role in the issuance of certificates of entitlement and had no part in the administrative decision which is at issue here. No action or omission by the President or his staff was called into question in this litigation.

Indeed, given that the parties stipulated as to how certificates of entitlement should be adjusted if the lower court were to invalidate the Secretary's action, and that the Clerk stipulated to be bound by any decision entered by the court, it may have been unnecessary for the lower court to issue any orders to the Executive Branch defendants. The court appears to have done so solely out of deference to the statutory procedure set forth in 2

U.S.C. § 2a(a). If this Court were concerned about the appearance of intrusion, therefore, it could order the lower court to modify its orders so as to achieve the same result by a more limited method.

It appears, for example, that the lower court could simply issue a prohibitory injunction barring the 1990 reapportionment to take effect as to Washington and Massachusetts, in accordance with the parties' Stipulation. Such a prohibitory injunction would not require even ministerial action by the Executive Branch defendants and the Clerk, and thus avoid the appearance of intrusion of which the Secretary complains. As a practical matter, however, it would have the same result as the three-judge

court's Final Decrees and Orders. 2 U.S.C. § 2a(b) provides that "Each State shall be entitled...until the taking effect of a reapportionment under this section or subsequent statute, to the number of Representatives shown in the statement [issued following the prior decennial census]..." Under a prohibitory injunction, therefore, Massachusetts and Washington would revert to the number of seats they enjoyed througout the 1980s, eight and eleven respectively. This is the same result as flows from the lower court's Final Decree and Orders, but may involve less appearance of intrusion into the ministerial functions of the President and Clerk.

Such a modification would not change the result of the lower court's orders,

and a cross-appeal may therefore be unnecessary. This aspect of the cross-appeal is filed in response to statements by the Court suggesting that in order for a party to obtain any modification whatever of a lower court's judgment, it must file a cross-appeal. See Federal Energy Administration v. Algonquin SNG, Inc., 426 U.S. 528, 560 n.11 (1976); Mills v. Electric Auto-Lite Co., 396 U.S. 375, 381 n.4 (1970).

CONCLUSION

The Court should note probable jurisdiction, reverse the holding of the district court insofar as it upheld the constitutionality of 2 U.S.C. § 2a, enjoin use of the method of equal proportions, and declare that the

Webster method is the only constitutional method of apportionment.

Respectfully submitted,

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AFFIDAVIT OF H. PEYTON YOUNG

I. BACKGROUND

1. I am Professor of Public Policy and Applied Mathematics at the University of Maryland. My curriculum vitae has been lodged with the Court. I have spent over fifteen years studying the mathematical theory and the legislative history of apportionment in the United States. The results of these studies are given in my book with Michel L. Balinski entitled Fair Representation: Meeting the Ideal of One Man One Vote, Yale University Press. 1982 (hereinafter Fair Representation).

2. I submit this affidavit in support of the brief of the Commonwealth of

Massachusetts before this Court as amicus curiae. References below to the "Stipulation" refer to the Stipulation of Facts entered into in the Massachusetts litigation and lodged with the Court.

II. THE NEAR AS MAY BE STANDARD

3. The history of apportionment legislation in the United States can be understood as a search for a formula that meets the constitutional ideal of one person, one vote as near as may be. The "near as may be" or close as practicable standard was first formulated by Daniel Webster in an address to the Senate in 1832: "The Constitution, therefore, must be understood, not as enjoining an absolute relative equality, because that would be

demanding an impossibility, but as requiring of Congress to make the apportionment of representatives among the several States according to their respective numbers as near as may be. That which cannot be done perfectly must be done in a manner as near perfection as can be .." The Writings and Speeches of Daniel Webster, National Edition. Boston: Little Brown, 1903, vol. 6, at 107-109.

4. Webster's address was provoked by an apportionment using the then-prevailing method of Jefferson. By the census of 1830, Jefferson's method gave 40 seats to New York (with a quota of 38.593) and 28 seats to Pennsylvania (with a quota of 27.117), but only 5 seats to Vermont (with a quota of 5.646) and only 1 seat to Delaware (with a quota of 1.517).

Webster pointed out that by taking one seat from New York and giving it to Vermont, and by taking one seat from Pennsylvania and giving it to Delaware, the representation of all four states would be brought closer to their quotas, that is, to their ideal numbers of seats. Hence the Jefferson apportionment did not meet the "near as may be" standard and, after 1840, was abandoned.

5. An apportionment meets Webster's "near as may be" standard if it is not possible to bring any state closer to its quota without moving some other state further away from its quota. (The quota of a state is the ideal share of a representative for each individual times the number of the individuals in that

state.) An apportionment with this property is also said to be "near the quota." Fair Representation at 132.

6. The most natural way to find an apportionment that is "near the quota" would appear to be the following: round up every state with fractional remainder above .5, and round down every state with fractional remainder below .5. But this rounding method may apportion too many or too few seats. For example, according to the 1900 census there are 29 states with fractional remainders above one-half. If all of them were rounded up, then 438 seats would be apportioned instead of the required 435. Hence at least three states with quotas greater than one-half must be rounded down. The problem is to determine which ones they should be.

7. Webster's solution to this problem was the following: "Let the rule be that the population of each state be divided by a common divisor, and, in addition to the number of members resulting from such division, a member shall be allowed to each State whose fraction exceeds a moiety of the divisor." The Writings and Speeches of Daniel Webster at 120. Thus, the rounding threshold for Webster is always .5, and a divisor is found that produces (presently) 435 seats. See also Stipulation 73.

8. Webster's method always yields apportionments that meet the "near as may be" standard. In other words, if some states can be brought closer to their quotas without moving any other states further from their quotas, the

Webster method will do so. Moreover, Webster apportionments never produce a situation in which one state with fraction above .5 is rounded down and simultaneously another state with fraction below .5 is rounded up. Fair Representation at 132. Such a situation is called a "reversal." A reversal does not meet the near as may be standard, because rounding the other way -- that is, rounding up the state with fraction above .5 and rounding down the state with fraction below .5 -- brings both states closer to their quotas, and brings the average share of a representative in both states closer to the national average share of a representative.

9. By contrast, the current statutory method of Hill (as well as the methods

of Dean, Adams, and Jefferson) often produce reversals, as I shall show below. Hence they do not meet Webster's near as may be standard. In fact, recognized methods of apportionment (e.g., Adams and Jefferson) often stray far from the quotas. For example, if Adams' method were applied to the 1990 census, it would allot California (quota 52.124) only 50 seats. Jefferson's method is similarly skewed the other way: in 1990 it would have given California 54 seats. These two methods are "rationally" tied to the states' populations, but in operation they often give results that do not come anywhere near the ideal of equal representation.

III. THE PAIRWISE COMPARISONS APPROACH

10. Webster's method is based on the premise that every state should be as close as possible to its ideal number of seats, that is, its quota. A different approach was first suggested in 1911 by Joseph Hill, a statistician at the Census Bureau. Hill's idea was to apportion seats among the states so that the relative difference in representation between every two states is as small as possible. This idea was later refined and elaborated by a Harvard mathematician named Edward V. Huntington.

11. Huntington observed that, in a perfect apportionment, the number of persons per representative -- the average district size -- would be the

same in every state. Likewise, the number of representatives per person -- the average share of a representative -- would be the same in every state. In practice, there will almost always be differences between the states because of the rounding problem.

12. An apportionment favors one state relative to another if each resident of the first state has a larger average share of a representative than each resident of the second state.

13. Huntington argued that the goal of apportionment should be to minimize the inequality in representation between every two states. In other words, it should not be possible to transfer a seat from the more favored state to the less favored state and reduce the amount

of inequality between them. This is known as the "pairwise comparisons" approach to apportionment. To make this approach workable, it is necessary to have a numerical measure of the "amount of inequality" between two states.

14. A natural measure of inequality between states is the absolute difference in their residents' average share of a representative, that is, the larger share minus the smaller share. Huntington showed that Webster's method is the only one that minimizes this measure of inequality.

15. A second measure of inequality between states is the absolute difference in the states' average district sizes, that is, the larger district size minus the smaller district

size. Huntington showed that Dean's method is the only one that minimizes this criterion of inequality.

16. A third measure of inequality between states is the relative difference in the average share of a representative in each state. (The relative difference between the shares is the absolute difference between them divided by the smaller of the two shares.) This notion of inequality is minimized by Hill's method. Hill's method also minimizes the relative difference between the average district sizes of every two states.

17. Huntington showed that two less natural measures of inequality lead to the methods of Jefferson and John Quincy Adams. He showed further that the five

methods -- Adams, Dean, Hill, Webster, and Jefferson -- are the only ones that result from minimizing one of his measures of inequality.

18. Huntington maintained that Hill's method (which he dubbed the method of "equal proportions" and which he attributed to himself rather than Hill) is the most appropriate of these five methods. One of his principal arguments was the Hill's method minimizes the relative difference in the average share of a representative on a pairwise basis, and also the relative difference in average district size on a pairwise basis. Hence it is not necessary to choose between average share of a representative and average district size as the measure of one person one vote, since they lead to the same result.

This argument is premised, however, on the assumption that the relative difference between states is a more appropriate statistical measure of inequality than the absolute difference. As demonstrated below, this premise is faulty if the goal is equal representation for each person.

IV. SHARE OF A REPRESENTATIVE AS THE PROPER MEASURE OF ONE PERSON ONE VOTE

19. I understand one person one vote to mean that every person should have equal representative in the House. Within each state, equality can be achieved by creating districts with equal populations. In this case there is no discrepancy between average district size and average share of a representative, for if all districts

have the same number of persons, then a fortiori all persons have an equal share of a representative. In the interstate context, however, where equal-sized districts are a practical impossibility, the two concepts are not equivalent.

20. To illustrate, suppose that a state has a population of 750,000 and that the national average district size is 500,000. The state is entitled to 1.5 seats (its quota). If it gets 2 seats then its average district size is 375,000. If it gets 1 seat its average district size is 750,000. It must get a whole number of seats, so it must either be advantaged or disadvantaged in any particular apportionment. Over several apportionments, however, the advantages and disadvantages should balance out.

21. For example, suppose that the population of the state remains fixed at 750,000 over two successive censuses, and that the national average district size remains fixed at 500,000. Thus, the national average share of a representative is 1 for every 500,000 persons. If the state gets 1 seat in the first census and 2 seats in the second census (or the other way around) it has been treated fairly on average. This can be verified in two ways. First, the average number of seats that the state received over the two censuses is 1.5, which is the number it should receive (its quota). A second way of verifying fair treatment is to compute the average share of a representative in each of the two censuses. In the first census the average share was 1 divided by 750,000 or 1.33 representatives per

million persons. In the second census it was 2 divided by 750,000 or 2.66 representatives per million persons. The average share over the two censuses was therefore 2 representatives per million persons, that is, one for every 500,000, which is exactly what it should be.

22. A different conclusion emerges if one compares average district sizes, however. The average district size in the first census was 750,000 and in the second census it was 375,000. Over the two censuses the average district size was therefore 562,500, which is larger than the national average (500,000). This would lead to the erroneous conclusion that the persons in the state had been underrepresented on average over the two censuses. The fact is that

the districts in the state were larger (on average over the two censuses) than the national average district, but the persons were treated, on average, equally with everyone else.

23. This example shows why the proper measure of one person one vote is the individual's share of a representative and not the average district size. If exact equality can be achieved (as in the intrastate context) then the two concepts are equivalent. They are not equivalent when, as in the interstate context, there are wide discrepancies in district size.

24. The effect of using average district size to measure inequality is to bias the outcome in favor of small states. To illustrate, consider an actual

situation that arose in 1920. New York had a population of 10,380,589 and New Mexico had a population of 353,428. Nationally, the ideal share of a representative was 4,135 per million. Thus New York's quota (the number of persons in New York times the ideal share) was 42,919, whereas New Mexico's quota was 1,461. The natural solution would be to give 43 seats to New York and 1 seat to New Mexico (which is what Webster's method would do).

25. The average-district-size test, however, yields a different result. The average district size in New York (with 43 seats) would be 241,409, while the average district size in New Mexico (with 1 seat) would be 353,428. According to the average-district-size test, the "amount of inequality" between

them is 112,019 persons per district. Suppose instead that New York received 42 seats and New Mexico received 2 seats. Then the average district sizes would be 247,157 in New York and 176,714 in New Mexico. The "amount of inequality" would then be 70,443 persons per district, which is smaller. By this reasoning, New York (with a quota of 42.92) would be rounded down to 42 seats and New Mexico (with a quota of 1.46) would be rounded up to 2 seats. This is a reversal (See Par. 8.)

26. A reversal does not meet the near as may be standard. New York would be closer to its quota if it got 43 seats instead of 42, and New Mexico would be closer to its quota if it got 1 seat instead of 2. Similarly, New Yorkers' average share of a representative would

be closer to the national average share if they got 43 seats instead of 42, and New Mexicans' average share of a representative would be closer to the national average share if they got 1 seat instead of 2. Both states would be closer to the ideal of one person one vote if the reversal were undone.

27. The methods of Adams and Hill also produce a reversal in this case. To see why Hill's method yields this result, suppose there were no reversal, so that New York receives 43 seats and New Mexico receives 1 seat. The average share of a representative would then be 4.142 per million in New York and 2.829 in New Mexico. According to the Hill relative difference criterion, the "amount of inequality" between the two states is the percentage by which 4.142

exceeds 2.829, which is about 46%. If instead New York receives 42 seats and New Mexico receives 2 seats, their average shares of a representative are 4.046 per million and 5.659 per million respectively. The relative difference between them is now about 40%, which is smaller than before. So according to Hill's method the reversal should stand.

28. The reason for this anomaly is Hill's reliance on the relative difference test, which is not appropriate here (see Par. 33-45). Webster's method uses the absolute difference between shares of a representative as the criterion of inequality, which does not produce reversals. For example, in 1920, Webster's method would have allotted New York 43 seats and New Mexico 1 seat.

The absolute difference between their shares of a representative would have been 1.313 per million. If instead New York received 42 seats and New Mexico received 2 seats (as it would under Hill), the absolute difference in their shares of a representative would have been 1.613 per million, which is larger. Therefore it makes more sense to give New York 43 seats and New Mexico 1 seat, and this involves no reversal.

29. This is not the only reversal that Hill's method would have produced in 1920 had it been the statutory method. Virginia (quota 9.547) would have been rounded down to 9 seats while Rhode Island (quota 2.499) would have been rounded up to 3 seats. North Carolina (quota 10.581) would have been rounded

down to 10 seats while Vermont (quota 1.457) would have been rounded up to 2 seats.

30. By contrast, in 1920, Webster's method would have rounded up all states with quotas above one-half and rounded down all states with quotas below one-half. There would have been no reversals. This is because Webster's method minimizes the absolute, instead of the relative difference, in the shares of a representative as between every two states.

31. Hill's method has actually produced a number of reversals since it was adopted in 1941. In 1970, for example, Hill's method rounded up South Dakota (quota 1.435) to 2 seats, while it rounded down Connecticut (quota 6.503)

to 6 seats. It also produced a reversal in 1960. In every one of these cases, the Webster solution would have produced no reversals, and brought all of the affected states closer to their quotas.

32. It is also significant that in every case where Hill's method produces a reversal, the less populous state is the one that is favored (rounded up) and the more populous state is the one that is disfavored (rounded down). This is part of a systematic pattern of bias in which Hill's method tends to give more representation to residents of small states than to residents of large states, as I shall explain below (Par. 46-63).

V. RELATIVE DIFFERENCE VERSUS ABSOLUTE AND PERCENTAGE DIFFERENCE

33. The Hill method is based on the premise that the relative difference is the right way to measure the difference between two numbers. When the goal is to minimize deviation from the ideal of equality, however, the relative difference is not the right way.

34. The absolute difference between two numbers is the larger number minus the smaller number. The relative difference between two numbers is the absolute difference between them divided by the smaller of the two numbers.

35. When two numbers are being considered in isolation, and there is no common standard or benchmark to which they may be compared, both the absolute

and relative differences are appropriate ways to measure "difference." For example, if per capita income in one country is $4000 and per capita income in another country is $6000, then the absolute difference is $2000 and the relative difference is 50%.

36. When there is an average or ideal value to which the numbers can be compared (as in apportionment), the relative difference is not appropriate. To illustrate, suppose that the average per capita income in a certain country is $6000 and that one region of the country has a per capita income of $4000, while another region of the same country has a per capita income of $8000. In the first region per capita income is 33 1/3% below the national average and in the second region it is

33 1/3% above the national average. But the relative difference between the first region's income and the national average income is 50% ($6000 is 50% larger than $4000), while the relative difference between the second region's income and the national average income is 33 1/3% ($8000 is 33 1/3% larger than $6000). The relative difference suggests that the deviation below the norm in the first region is larger than the deviation above the norm in the second region, which is not the case.

37. When measuring differences from an ideal, either the absolute difference or the percentage difference from the ideal should be employed. The relative difference is neither standard nor appropriate as a statistical measure of deviation from a norm.

38. In apportionment there is a norm or ideal to which individuals can be compared, namely, the national average share of a representative. To measure the overall deviation from this ideal, a standard approach would be to compute the absolute difference between each individual's share and the national average share, square the result, and then sum the squared differences over all individuals. (This is the "variance" of the shares.) Webster apportionments minimize this overall measure of inequality, and they are the only apportionments that do so.

39. An alternative, but fallacious approach, would be to minimize the overall inequality ("variance") in district sizes. One would compute the absolute difference between each

district size and the national average district size, square the result, and then sum over all 435 districts. The only apportionments that minimize this measure of inequality are Dean apportionments.

40. As already addressed, however, the district size is not the relevant standard for one person one vote. Each district corresponds to one representative. To bring all district sizes as near equality as possible is to treat all representatives as equally as possible. The relevant principle is to treat all citizens as equally as possible. The average share of a representative is the only appropriate standard for this purpose.

41. The Hill method's reliance on the relative difference between every two states results in apportionments that do not treat the citizens in these states as equally as possible. In 1990, Hill's method gives Massachusetts 10 seats, and its residents' share of a representative is 1.6586 per million persons (10 divided by 6,029,051). Oklahoma gets 6 seats, and its residents' share of a representative is 1.9002 per million persons (6 divided by 3,157,604). The difference between the shares is .2416. If Massachusetts were given 11 seats and Oklahoma 5 seats (as they would be under Webster's method) then the share would be 1.8245 in Massachusetts and 1.5835 in Oklahoma. The difference is .2410, which is smaller than under the current apportionment. Webster's method comes

closer than Hill's to giving each person equal representation in the House.

42. Hill's method does not meet the near as may be test in percentage terms either. Together, Massachusetts and Oklahoma have 9,186,655 residents and they receive 16 seats under Hill's method. So the average share of a representative for the two states combined is 1.7417 per million. As noted in the preceding paragraph, the Hill apportionment results in a share of a representative in Massachusetts of 1.6586 per million, and a share of a representative in Oklahoma of 1.9002 per million. Thus Massachusetts is 4.77% below the average share for the two states combined and Oklahoma is 9.1% above the average share for the two states combined. Under the Webster

apportionment the share in Massachusetts would be 1.8245 per million and the share in Oklahoma would be 1.5835. The former is 4.75% above the average share for the two states combined and the latter is 9.08% below the average share of the two states combined. Hence the Webster apportionment brings both states closer (in absolute and percentage terms) to the average share of a representative for the two states combined.

43. The state of Montana alleges that Dean's method comes closer than either Hill's or Webster's method to meeting the one person one vote standard. This is not the case. In 1990 Montana had a population of 803,655. Dean's method would allot it 2 seats, so its share of a representative would be 2.4886 per

million. The state of Washington had a population of 4,887,941 and Dean's method would allot it 8 seats, so its average share of a representative would be 1.6367 per million. Thus the absolute difference between the shares is .8519. If instead Washington were allotted 9 seats and Montana were allotted 1 seat (as would be the case under either Webster's method or Hill's method), Washington's average share would be 1.8413 and Montana's would be 1.2443. The absolute difference under this apportionment is .597, which is smaller. Under Webster's method the individual residents of Washington and Montana have more equal representation than under Dean's method.

44. In summary, Webster's method comes as close as practicable to equalizing

each person's share of a representative and to bringing all the states as close as practicable to their quotas.

45. By contrast, Hill's method fails to do either because it is based on the relative difference instead of absolute or percentage difference. The relative difference is not appropriate when there is an ideal standard against which comparisons can be made, as in this case. Hill's method also leads to reversals: a state with fraction above .5 may be rounded down, while a state with fraction below .5 may be rounded up. Reversals can also occur under Dean's and Adams' methods. They never occur under Webster's method. Moreover, whenever reversals occur under the methods of Adams, Dean, or Hill, the state that is rounded down (the

disfavored state) is always the larger of the two, while the state that is rounded up (the favored state) is always the smaller of the two. (By "larger" state I mean more populous state and by "smaller" state I mean less populous state.) In this sense these methods discriminate against the larger states.

VI. BIAS

46. Huntington asserted, nevertheless, that Hill's method is even-handed in its treatment of small and large states. He reached this conclusion by the following fallacious argument. Of the five methods that minimize pairwise measures of inequality (Adams, Dean, Hill, Webster, Jefferson), Adams favors small states the most and Jefferson's method favors large states the most. (In fact,

Congress had rejected Jefferson's method in 1840 in part because it was biased in favor of large states. Fair Representation at 35.) Of the remaining three methods, Dean's favors the small states more than Hill's, and Hill's favors the small states more than Webster's. Fair Representation at 118. Therefore, said Huntington, Hill's method "has no bias in favor of either the larger or the smaller states." Edward V. Huntington, "The Apportionment Situation in Congress," Science, December 14, 1928, at 580.

47. This argument does not establish in any way that Hill's method is unbiased. It merely says that, of the five methods, Hill's favors small states less than two methods and favors small states

more than two other methods. See Stipulation 69.

48. Huntington's views were challenged by the prominent statistician Professor Walter Willcox of Cornell. Willcox, who was at various times president of the American Statistical Association and the American Economic Association, argued that Webster's method is even-handed in its treatment of small and large states while Hill's is biased toward small states. Instead of relying on abstract mathematical arguments, as Huntington did, Willcox demonstrated this point by analyzing data. He prepared tables and diagrams showing how the small and the medium and the large states fared individually, and as groups, under each of the five methods. He concluded that "if the main purpose is, as it probably

was in the Constitutional Convention of 1787 to hold the balance even between the large and the small States as groups, that end is best secured by the method of [Webster]." U.S. Congress House, Apportionment of Representatives, 1928, at 61, from a memorandum submitted by Walter F. Willcox, dated February 21, 1928; Fair Representation at 55.

49. Congress was understandably confused by these rival claims and turned for advice to the National Academy of Sciences. The Academy appointed a committee of four prominent mathematicians to study the matter. In their 1929 Report to Congress, the committee repeated Huntington's arguments: "There are five methods of apportionment now known which are unambiguous . . . and should be

considered at this time. These five methods are [Adams, Dean, Hill, Webster, Jefferson]. In the present state of knowledge your committee regards these as the only methods of apportionment avoiding the so-called Alabama paradox which require consideration at this time. . . . Each method in the list favors the larger States as compared with the methods which precede it. This means in the case of the second [Dean] and fourth [Webster] methods, for example, that if for two unequal States A, B, the fourth method assigns more Representatives to A and fewer to B than the second method, then the State A is the larger of A and B. The method of [Dean] and the method of [Webster] are symmetrically situated on the list. . . . A similar symmetry exists for the methods of [Adams] and [Jefferson] for

which the [measures of inequality] seem, however, more artificial than those for any one of the other three methods. The method of equal proportions is preferred by the committee because it satisfies the [relative difference] test . . . when applied either to sizes of congressional districts or to numbers of Representatives per person, and because it occupies mathematically a neutral position with respect to emphasis on larger and smaller States." This opinion was reiterated in a 1948 report by another National Academy of Sciences committee. Stipulations 69 & 70.

50. The claim of mathematical "neutrality" therefore amounted to nothing more than the observation that Hill's method ranked third in a list of five methods. This argument does not in

fact demonstrate that Hill's method is unbiased. Moreover, it is not clear that Congress acted on or accepted this argument. In 1941, the adoption of Hill's method over Webster's had the effect of giving one more seat to Arkansas (in that period a predominantly Democratic state) and one less to Michigan, a state which in that period tended to vote Republican. Every Democrat in the House, except those from Michigan, voted for the change to Hill's method, and every Republican voted against.

51. An apportionment method is biased towards a state or class of state if, over many apportionments, it tends to give the residents of these states more than their fair share of representation on average. Similarly, a method is

biased against a class of states if, over many apportionments, it tends to give their residents less than their fair share of representation on average.

52. Bias in an apportionment method only becomes apparent by looking at its results over many different censuses. A simple test of bias is the following. In each census, compute the percentage difference between the number of seats that each state received and the state's quota. This is the state's percentage deviation from the ideal. It is the same as the percentage difference between the state's average share of a representative and the national average share of a representative. For each state compute the average percentage deviation from the ideal over many different censuses. If the result is

positive the state was favored on average, if negative it was disfavored on average. An apportionment method is unbiased if, over many censuses, the average percentage deviation from the ideal is close to zero for every state.

53. The twenty-one historical United States censuses from 1790 to 1990 provide a natural source of data to test for the presence of bias in various apportionment formulas. If Hill's method had been used throughout this period, the residents of Massachusetts would have received, on average, about .8 percent less representation that their ideal share. On the other hand, if Webster's method had been used throughout this period, the residents of Massachusetts would have received, on

average, almost exactly their ideal share.

54. Massachusetts is not the only large state that, on average, would have been underrepresented over the years under Hill's method. (Massachusetts received less than it quota of seats in five out of the six censuses since 1941. Stipulation 83.) Under Hill's method, the residents of the large states would have received less than the national average share and the residents of the small states would have received more than the national average share, over the twenty-one historical censuses on average. This is true even after allowing for the constitutional provision of a minimum of one seat per state.

55. To verify this proposition, I considered each census from 1790 to 1990 and divided the states into four categories. The "very small" states are those with a quota less than .5. The Constitution mandates that these states receive one seat each no matter how small their quotas, so they will necessarily be favored in any constitutional apportionment. After setting these states aside, I divided the remaining states into three approximately equal-sized groups: large, medium, and small.[1/]

1/ If the number of states remaining after the very small states are deleted is not divisible by three, then the "medium" category of states takes up the extras.

56. In any given apportionment the large states are favored as a group if their residents' average share of a representative is more than the ideal (the national average share of a representative). They are disfavored as a group if their residents' average share of a representative is less than the ideal. Similarly the small states are favored as a group if their residents' average share of a representative is more than the ideal; they are disfavored as a group if their residents' average share of a representative is less than the ideal.

57. Every method will sometimes favor the large states as a group and sometimes favor the small states as a group, depending on how the population counts happen to fall. An unbiased

method will sometimes favor the small states and sometimes favor the large states, but over many apportionments these advantages and disadvantages will more or less balance out. A biased method, by contrast, will show a systematic tendency to favor one group or another over many apportionments.

58. Since it was adopted in 1941, Hill's method gave the residents of small states, on average, over 6 percent more representation per capita than it did to residents of large states. If Hill's method had been used in all twenty-one historical censuses from 1790 to 1990, it would have given, on average, over 3.3 percent more representation per capita to residents of small states than to residents of large states. These

results provide concrete evidence that Hill's method is biased against the large states.

59. The state of Montana is proposing to replace Hill's method with either Dean's method or Adams' method. But these two methods are even more biased towards small states than Hill's. Over the twenty-one historical censuses, Dean's method would have given, on average, over 5 percent more representation per capita to the small states than to the large states. Adams' method would have given, on average, over 18 percent more representation per capita to the small states than to the large states.

60. The Webster method would have produced much more even-handed results than Adams, Dean, or Hill. If Webster's

method had been used in all twenty-one historical censuses, then on average it would have given less than one-half of one percent more representation per capita to residents of small states as compared to residents of large states.

61. Moreover, in every single census the percentage difference between a person's share of a representative in large states and a person's share of a representative in small states would have been smaller, and at least not larger, under Webster's method than under any of the other three methods. In this sense, the Webster apportionments would have come at least as close, and often closer, to meeting the ideal of one person one vote than the Hill, Dean, or Adams apportionments.

62. These results are buttressed by theoretical calculations. It can be shown that, in a variety of statistical models, Webster's method is the least biased of all divisor methods. Fair Representation at 118-128. These same models show that Hill's method is biased toward the small states. The magnitude of this bias can be estimated theoretically. Under the current distribution of seats, Hill's method can be expected to give between 3 and 4 percent more representation per capita to the small states than to the large states over many apportionments. The Webster method can be expected to exhibit no discernible bias toward either the small states or the large states over many apportionments. Computer simulations support this observation. M.L. Balinski and H.P.

Young, Evaluation of Apportionment Methods, report prepared under Contract No. CRS 84-15 for the Congressional Research Service of the Library of Congress, Washington, D.C., 1984. Such simulations would have been difficult if not impossible to carry out by the National Academy of Sciences committees in 1929 and 1948 because they lacked modern computing technology.

63. Thus theoretical calculations, computer simulations, and empirical evidence provided by historical census data all support the conclusion that Webster's method is substantially less biased than Hill's method.

VII. CONCLUSION

64. In summary, Webster's method is superior to Hill's method for three reasons. First, Webster apportionments bring each person's share of representation as near equality as possible no matter in what state they reside. Second, Webster apportionments bring the states as close to their shares (quotas) as possible: no state can be brought closer to its quota without moving some other state further from its quota, whether measured in absolute or percentage terms. Hill apportionments do not meet this standard. Indeed, it may be shown that Webster's method is the only divisor method that does meet this standard. Third, Webster's method comes closer to treating large states and small states

evenhandedly. The empirical evidence based on twenty-one censuses is that Hill's method would have awarded, on average, over 3.3 percent more representation to residents of small states than to residents of large states. Over these twenty-one censuses Webster's method would have given, on average, less than half of one percent more representation to residents of small states than to residents of large states. Theoretical models suggest that, over a long series of apportionments, Hill's method will give on average between 3 and 4 percent more representation to residents of small states than to residents of large states, given the current distribution of seats among the fifty states. These same models suggest that, over a long series of apportionments, the Webster

method would have no discernible bias in favor of either small or large states. Fair Representation at 127-8. Computer simulations over a thousand hypothetical apportionments support the proposition that Webster's method has no discernible bias toward small or large states, whereas Hill's method is biased toward small states. Balinski and Young report to the Congressional Research Service.

65. For these three reasons, Webster's method comes closer than any other method (and in particular closer than the methods of Hill, Dean, and Adams) to meeting the constitutional standard of one person one vote, and to achieving equal representation as nearly as practicable.

Signed under the penalties of

perjury this 10th day of February, 1992.

/s/_____

H. Peyton Young

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS, et al.,	)	
Plaintiffs,	)	
v.	)	CIVIL ACTION NO. 91-11234-WD
BARBARA HACKMAN FRANKLIN, As Secretary of the United States Department of Commerce, et al.,	)	
Defendants.	)	

NOTICE OF APPEAL TO THE SUPREME COURT OF THE UNITED STATES

Notice is hereby given that plaintiffs Commonwealth of Massachusetts, Edward F. Berlin and Karen J. Kepler, hereby appeal to the Supreme Court of the United States from the Final Decrees and Orders, dated February 20, 1992, of the three-judge

court. This appeal is taken pursuant to 28 U.S.C. § 1253.

Respectfully submitted,

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